An Account of ſome Books.

I. *Marcelli Malpighii* ANATOME PLANTARUM; *cui ſubjungitur Appendix, iteratas & auctas ejuſdem de* OVO INCUBATO *Obſervationes continens.* Londini, *Impenſis* Joh. Martyn, *ad inſigne Campanæ in Cœmeterio D.* Pauli, 1675. *in* fol.

THe Excellent Author undertakes in this Treatiſe to exhibit the Inward ſtructure of Plants both by Diſcourſe and Scheams, according to the Obſervations, himſelf hath made thereof by a Microſcope; with a deſign, thereby to diſcover the cauſes of the ſeveral appearances, qualities and effects of Plants, as they may depend upon the various Poſition, Size and Shape of their parts, and upon the different ways of Percolation, Fermentation, and the like operations in the ſame.

He begins with the *Bark*, and proceeds to the *Woody part*, and the *Knobs*, and ſo on to the fabrick of the *Buds*, *Bloſſoms*, *Leaves* and *Seeds*: Promiſing at the end to prepare another Work about the *Roots* and *Excreſcences* of Plants; that ſo, having ſurveyed and well conſidered the Hiſtory and matter of fact, he may proceed to make an Eſſay of what is thence deducible touching the Cauſe and Manner of *Vegetation.*

Concerning the *Bark*, he finds it to be made up of ſeveral parts, of which the prime ones are thoſe he calls *Ligneous* or *Woody fibres*, in his opinion analogous to *Nerves*, which he ſaith are pipes pervious to a clear liquor; the ſtructure of which Pipes conſiſt in many ſquare partitions, opening into one another. Theſe veſſels he finds to lye neither ſtraight nor parralel, but to be for the moſt part compacted like little fagots; of which ſome do make a kind of Net-work, whereby the Bark becomes to be an aggregate of reticular coats, ſurrounding the Woody part of the plant: And as to what paſſes through them, he ſaith, that the Juyce being entred into them, is, by the heat of the Seaſon ſtriking upon the Soyl and forcing up the liquor, made to aſcend a little way; and then by the ſurvening night and cold ſtopt for the time, but is again, by the

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the heat of the next day, ſending up more Juyce, thruſt up higher from time to time, till it gets to the top , climbing thither as twere by ſteps: To which aſcent it is marvellouſly aſſiſted by the ſtructure of theſe Pipes, being divided into ſquare partitions, opening into one another, and furniſh'd with ſomething that performs the part of Valves, endowed with a Spring.

From theſe Pipes, he ſaith, do depend and break forth Horizontal ranks of Baggs or *Bubbles*, croſſing thoſe Fibres; into which bubbles the aſcending Juyce, like a chyle, is diſcharged, and being ſtay'd there a while, and mixed with the old Juyce there reſiding, comes to be fermented, and advanced to the nature of an Aliment: Whence it comes to paſs, that in many of thoſe Bubbles there fall out due precipitations of a tartareous matter, which is condenſed and hardned in theſe veſſels. And 'tis in theſe Bubbles, ſaith he further, that much of this Juyce is digeſted, which afterwards is diſtributed to the Woody, and other parts of the Plant.

But, beſides this preparation of the Aliment made in the *Bark*, there is another office, which that part ſeems to be appointed for; and that is the increaſe of the bulk of Plants, by adding yearly a coat or ring of Fibres, which being interwoven by theſe Horizontal ranks of Bubbles, and by degrees conſolidated and hardned, do put on the nature of *Wood.*

The *Stem* or *Trunck* of Plants conſiſts, according to him, of *Ligneous fibres*, tranſverſe *ranks* of *Bubbles*, and *Air-pipes.* In young Trees, he ſaith, the ranks of theſe Bubbles paſs into the very Pith; which pith is abounding in young Twigs, until by the growth and hardning of the ligneous fibres it waſtes away. Now the clear Juyce, which through the Woody filaments riſeth up into the ſtem and branches, is diſcharged into the lateral appendages of the Bubbles, and there advanced, as hath been ſaid already, into a nouriſhing Juyce: And *as* in Animals the new Aliment enters under the form of Chyle into the Veins, where being mingled with the old blood, which is endow'd with ſeveral ferments, as the *lympha* and others, and ſo circulated into the habit of the whole body, it enters into all the parts of it, in which it meets again with determinate ferments raiſing them to the peculiar nature of every part, tranſpiring and precipitating what is uſeleſs; *ſo* in Plants the Juyce, conveyed through the ligneous pipes, is carried to the old Juyce harbour'd in the ſaid Bubbles, and is there and in the Pith fermented and further prepared, and kept to furniſh matter for future Buds and Leaves.

The *Air-pipes*, called alſo by him *Spiral fibres*, are, in his opinion, a kind of Silver-colour'd plate, wreathed ſpirally, and ſo conſtituting an open hollow pipe, of a ſcaly texture, made up of little pipes and bladders, very like the Lungs of Inſects, admitting contraction and dilatation. Whence he concludes the great neceſſity and uſe of Air and Reſpiration in all thoſe Creatures that have even but the leaſt degree of life: Which Air, he ſaith, is in Plants taken-in chiefly by the Root out of the Earth, there being no ſuch conſpicuous Air-pipes in the Bark or Leaves, whereas the Roots are exceedingly ſtored with them. This Air, contained in theſe pipes, and ſubject to compreſſion and rarefaction, preſſes by its ſwelling upon the contiguous Woody fibres and their adhering bubbles, and ſo ſqueezes out their Juyce into the neighbouring parts; which being relaxed and emptied, they admit and take in freſh liquor.

Such Plants, as inſtead of *clear* liquor contain in their fibrous pipes a *colour'd* Juyce, have a peculiar veſſel, as in the *Ebulus* (*Dane-wort*) fig. 30, and in all Lactiferous and Reſinous plants, fig. 31. And each Plant ſeems to our Author to have a peculiar veſſel to contain and prepare the laſt and ſpecifick nouriſhment for that plant; ſuch as are thoſe, that hold the Turpentine and Rozin in ſome Trees; there being as many ſeveral ſorts of Juyces as there are *ſpecies* of Plants, and therefore peculiar Veſſels, preparing the laſt and proper juyce for each reſpective Plant.

The *Stems* of Trees and their Branches *increaſe* by the external addition of a new Coat of Fibres and Air-pipes, growing about them every year, and thereby giving them a new Ring of wood.

As to the *Knobs* of Plants, they are to our Author nothing but the productions of new Off-ſprings upon a new implication of Fibres and Air-pipes, for the ſhooting out of new Leaves, and young Sprouts or Buds.

A *Bud* is, as 'twere, the new *Fœtus* or birth of a Plant, or a Sprout contracted in ſmall, incloſing a tender woody part (raiſed from ligneous fibres and medullar bubbles) and the rudiments of the Leaves. Here our Author takes notice, that Nature, in ordering the ſeveral kinds of *Living* things, conſtantly proceeds in almoſt the ſame, or at leaſt in an analogous, method: Conſidering, that in *Animals*, that are called perfect, ſhe raiſes them from Eggs by a continual augmentation and nutrition to their due magnitude, joyning from time to time new particles to the former; yet ſo, that in every ſtate of increaſe, that form, which was firſt of all in being, is ſtill maintained, no part emerging anew in the Animal but Teeth and Horns; whereas in *Inſects*, beſides the increaſe, there come forth parts, whoſe rude lineaments lay hid before, in the Infancy of thoſe Creatures; ſuch as are Wings, Feelers, and the like: And to *Plants* ſhe gives a daily increaſe by inveſting the trunk and branches with a Woody ſupercreſcent Coat, but ſo, that from the tender Branches there ſpring forth every year young ſprouts out of a precedent bud. And *as* in a Caterpillar the rudiments of ſome parts, being yet fluid, lye a pretty while concealed in little bags, until by the repoſe of the Inſect, under the form of an *aurelia*, they grow and come forth more ſolid; *ſo*, ſaith our Author, the parts of a Branch lye at firſt hid in the bud, till afterwards being enlarged by the moiſture and warmth of the Spring, they extend themſelves into the form of a Sprout.

The *Leaves* are, to our Author, a conſiderable part of the Plant, ſeeing that all thoſe parts, that are wrapt up in the ſtem or trunck, do, when opened in the extream and younger parts, break out into Leaves; ſo that theſe ſeem to be nothing but appendances to the Trunck lengthned and opened; the ligneous Pipes and Air-veſſels, derived from the midſt of the Woody cylinder of the tender Ring, running together into a bundle, and forming the Stalk, and at length upon their dilatation compleating the Leaf. The great variety of Leaves our Author deduces from the tranſverſe ranks of Bubbles appendant to the woody pipes of the Stem, upon the opening of the Stalk.

The *Office* of the Leaves ſeems to him very conſiderable, foraſmuch as, in his opinion, they perform the part of the *Skin* in Animals, which in them is ſo made up of Nerves, Veins, Arteries, Lympheducts, Tendons, and Glanduls, that the nouriſhing Juyce, by ſmall paſſages conveyed into it, acquires a new texture and a new kind of fluidity, whereby what is uſeleſs is ſeparated, and the reſt, being returned into the inner habit of the Animals body, nouriſhes and repaires it. Thus, ſaith he, there are found in *Leaves* all the ſorts of Veſſels to be met within the body of Plants, as Air-veſſels, Woody-fibres, and Veſſels of Tranſpiration. This he illuſtrates by Obſervations taken from Inſects, and upon whoſe skin abundance of moiſture gathers together; they alſo frequently caſting their skin, as Plants do their leaves. This opinion of his, *viz.* that the Nutritious Juyce is further concocted in the Leaves, he endeavours to render more probable by the conſideration of the little Seminal Plant, which contains two Leaves; inſinuating alſo, that from the Leaves there is a regreſs of the concocted Juyce into the ſtem, and conſequently a peculiar circulation.

But to proceed; our Author eſteeming the Branches to be produced for the generation of the Vegetable Egg, he teaches, ſutably thereunto, that a *Bloſſom* or *Flower* is, as 'twere, the *Uterus* together with the Egg or *fœtus* of the Plant, which in due ſeaſon is expoſed to the Air, to make it grow at length into a new Off-ſpring. In explaining the manner of the production of *Flowers*, and their variety, he is very curious; as he alſo is in that of *Seeds*; which latter he obſerves to be lodged in divers Caſes or Caskets, performing the office of an *Uterus* and the parts thereof. And ſeeing the *Seed* grows in very many Plants to an edible *Fruit*, he deſcribes the ſtructure and parts of ſeveral Fruits, viz. *Figgs*, *Cherries*, *Grapes*, *Pears*, *Citrons*, *Limons*, *Oranges*, *Gourds*, *Straw-berries*, *Nuts*, *Almonds*, *Acorns*, *Cheſnuts*, *Legums*, *Corn*, &c. taking notice of the ſingular *apparatus*, formed by Nature for the ſake of the *Seed*, which he calls the *Fœtus* and the true compendium of a Plant, made up of all the principal parts thereof. Upon all which he enlarges with great accurateneſs.

But his Obſervations about *Galls*, and other Excreſcences and Appendages of Trees, he reſerves for another Diſcourſe (which we have reaſon to expect wirhin a little time;) yet noting here in ſhort, that thoſe Excreſcences are not the *Wombs*, in and by which, Trees and other Plants produce Inſects; but only the Neſts of the Egg caſt there by the Animal parent, and not at all furniſh'd by the Plant it ſelf.

As to the *Uſe* of the parts of Plants, eſpecially the paſſage of the Aliment, he is very ſparing, and modeſt in giving his opinion about it, judging it difficult not to miſtake herein. Mean time, he interſperſes, in the Explication of their ſtructure, his thoughts concerning it, having well conſidered the diverſity of Veſſels in Plants, *viz.* the great number of pervious Fibres in the Bark, the abundance of other Fibres in the Ligneous part, ſome of which are compos'd of a Spiral zone, others made up of roundiſh Bubbles, opening, as 'twere, into one another; there being alſo a peculiar veſſel, that yields Milk or Rozin.

Thus far of our Authors ANATOME OF PLANTS: Touching his *Appendix* of *Incubated Eggs*, he therein ſhews, with what care he hath repeated his former Obſervations upon that ſubject*; though he ſtill ſcruples to determine, which of theſe two, the *Heart* or the *Blood*, hath the priority of exiſtence in the Formation of a Chick: This only being certain to him, that there may be obſerved the *prima ſtamina* or firſt lineaments of the Chick even *before* Incubation, and that afterwards, *by vertue* of the Incubation there are firſt manifeſted the *vertebræ*, and the beginnings of the Brain and the Spinal marrow, together with the Wings, and ſome Fleſh; the Heart, Veſſels, and Blood yet lying then concealed: But yet, becauſe that ſome rivolets do appear in the umbilical *area*, he thinks it probable, that the Heart is then alſo appendant to the *carina* of the Chick, he having ſeen the Heart before the thirtieth hour: But 'tis a conſiderable time, he ſaith, before the Liquor paſſes through the Heart and the Veſſels; which Liquor he hath obſerved to be firſt of a yellowiſh, then of a ruddy, and at laſt of a Blood-red colour. Whence he again offers his conjecture, that the Liquor, the Veſſels and the Heart do exiſt *before* the Blood.

II. *Epiſtola*

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* *Theſe were alſo dedicated to the* Royal Society, *and by their Order printed* A. 1673. *by Mr.* John Martyn.

II. *Epiſtola ad D.* Joelem Langelotum *de* ALCALI *&* ACIDI *Inſufficientia ad gerendum munus Principiorum Corporum naturalium: Conſcripta à* Joh. Bohn *Phil. & Med. D. in Acad. Lipſienſi. Lipſiæ, A.* 1675. *in* 8°.

IN this Epiſtle, as the Author declareth himſelf highly diſſatisfied with the *Peripatetick* and *Chymical* Elements of Bodies natural, and affirms the Weakneſs of them to have been ſufficiently laid open, and chiefly by the Experiments of thoſe two great Engliſh Philoſophers, *Bacon* and *Boyle* †; ſo he undertaketh to prove the Inſufficiency of that lately celebrated *duumvirat* of Principles, the *Alcali* and *Acid*, by the congreſs and conflict of which the Maintainers of them preſume to give an account of all the *phænomena* of Nature.

† *The latter of which hath ready for the preſs a Diſcourſe of the ſame ſubject with this Epiſtle; which he was pleaſed to give a peruſal of to the Publiſher, before he would caſt an eye upon this piece of our Author.*

This Undertaking of our Author is here performed, 1. By repreſenting the Obſcurity of theſe two Principles: 2. By examining ſome Inſtances in which they are alledged to perform all the effects thereunto belonging. 3. By ſhewing the Neceſſity of at leaſt one Principle more, as active as any of thoſe two.

The *firſt* of theſe he endeavours to make out by taking notice in the *firſt place*, that as yet we have not ſo much as competent Definitions of an Acid and Alcali, and that thoſe which are taken from our Senſes are unſatisfactory for explaining the inward conſtitution of Bodies; there being ſome ſubſtances endow'd with certain vertues or powers not diſcernable by any of our ſenſes, and the Acids and Alcali's being capable of being reduced into ſuch minute particles, as alſo of being ſometimes thus diſſociated by mixtures, that the Taſt ſhall not at all be able to diſcover them, and that even in ſuch Concrets, whoſe activity depends from one or other of thoſe Principles.

Next, he conſiders, that that affection, which is aſcribed to theſe Salin Principles, namely, their mutual Efferveſcence, is not of that latitude, as to explicate by it *all* the phænomena of Nature, though he denies not, that by means of their powers very many effects, and thoſe admirable ones, may be explicated, ſuch as are ſolutions, precipitations, diſtillations, ſublimations, calcinations, &c. But that *all* cannot be by ſuch a reaction accounted for, he inſtances *firſt* in the known vertue of Alcaly's upon Mineral Sulphurs, ſuch as Salt of Tartar or fixt Nitre and Common Sulphur, which may be reduced into white powder, out of which may be extracted a Tincture as well by theſe fixt Salts, as by the volatil ones of Sal Armoniac and Harts-horn, and by their means a Sulphur out of Antimony; yet *without* any ſenſible efferveſcence, even when they are prepared in *formâ humidâ*. *Secondly*, he inſtances in divers Rozins diſſolved by the Whites of Eggs without any obſervable Efferveſcence, and in Turpentin diſſolving ſeveral Gums without any commotion. To theſe he adds the Inſtance of the Coagulation of Quick-ſilver by the fume of melted Lead, without any reaction of an Acid and Alcali, that is perceivable.

Beſides, he obſerves, that 'tis doubtful, whether all thoſe Subſtances that do tumultuate with an Acid, are Alcaly's, or that do boyl up with Alcaly's, are Acid. For 1. *Acids* do boyl up with *Acids*, and mutually render turbid and do precipitate their Solutions; as Spirit of Salt or Vitriol works upon the Solution of Silver or Copper made by *Aqua-fortis* or Spirit of Nitre; as alſo Spirit of Vitriol, and Spirit of Salt heats, and turns into a whitiſh *Offa*, by a Solution of Saturn, made with diſtilled Vinegar; And *Aqua-fortis* and Spirit of Nitre, though they make no ſenſible ebullition in the ſaid Liquor, yet they cauſe the particles of Saturn to ſubſide at the bottom in the form of a whitiſh powder.

Moreover, he notes, that an Acid is put into commotion by that which is neither an Acid or Alcaly; as Oyl of Vitriol mingled with either common or diſtilled Water, and likewiſe with ſpirit of Wine and oyl of Turpentine.

Again, he finds alſo, that neither all what boyls up with an Alcali, or receiveth it into it ſelf, is therefore preſently to be taken for an Acid; becauſe the liquor of Nitre fixed by coals, and Oyl of Tartar, do as well as juyce of Citron, Vinegar, &c.

ſeparate the parts of Milk; which, he ſaith, he hath alſo often ſeen done by putting Gall into Milk.

Having diſpatcht theſe particulars, he proceeds to ſhew *ſecondly* by divers Inſtances, that many effects are commonly aſcribed to Acids and Alcaly's, which are not due to them, becauſe they are either not at all to be found in thoſe bodies, whence ſuch effects proceed, or not in that quantity, which is neceſſary to maſter and ſubdue the power of the other parts of the Concret.

Laſtly, to evince, that there is at leaſt a *third* principle in Concrets, that hath as great a power to act, as thoſe two; he inſtances in the Amalgamation of Gold and other Mettals, that is performed with Quick-ſilver, which is ſo mixed with them *per minima*, that they are changed together into an unctuous maſs; whereupon, the Mercury being ſeparated again, either by paſſing it through Leather, or by diſtillation, or by flowers of Sulphur kindled, the Mettals appear again in the form of a very ſubtile *calx*. But now, that there ſhould proceed from Mercury, or any Acid ingredient thereof, a calcining power, the known effect of Acids being Corroſion, our Author cannot aſſent to: Eſpecially ſince, as he affirms, Mercury highly rectified and freed from all its acidity, retains notwithſtanding its former amalgamating and corroding vertue.

What this *third* ingredient of Concrets ſhould be, our Author thinks difficult to determine; he offers only to call it the Sweet and Inflammable Principle in Combuſtible bodies: Yet would not be underſtood to eſteem it a Catholick principle, nor to exclude a fourth or more Principles. All which he concludes with a diſcourſe tending to evince, that the Inflammability of Bodies depends not upon their Acidity.

IV. Zymologia Chymica, *or a Philoſophical Diſcourſe of* Fermentation, *from a New Hypotheſis of* Acidum *and* Sulphur; *With an additional Diſcourſe of the* Sulphur-Bath *at* Knarſbrough: *By* W. Sympſon *M.D*, London, 1675. *in* 8°.

THe Learned Author, not being ſatisfied with any thing he had yet ſeen extant upon this argument of *Fermentation*, propounds in this Tract a New *Hypotheſis*, as an *Eſſay* towards the further improvement of that noble Doctrine; endeavouring to ſolve, from the inward conflicts of *Acidum* and *Sulphur*, the phænomena of all *Hot-Baths*, the generation of *Minerals*, the production of many *Spaw-waters*, the grand appearances of *Heat*, *Fire* and *Light*; as alſo various other Subterraneal phænomena, as *Damps*, *Earthquakes*, *Eruptions*; likewiſe the appearances of *Meteors*, and divers other both remarkable and entertaining effects.

In the doing of this he *firſt* explains, what he means by *Fermentation*; and *ſecondly* ſets forth the large extent thereof in the whole orb of Nature.

He defines *Fermentation* to be nothing elſe but an inteſtine Colliſion betwixt *Acidum* and *Sulphur*, put together by Nature or Art, and ſet into a combating motion, in order to the production of Concrets, or to ſome other equivalent end.

This definition he applies *firſt* to the productions in the *Mineral* kingdom, undertaking to ſolve from thoſe two Principles the phænomena of *Hot-baths*, and the production of *Minerals*, and other ſubterraneal appearances. Where he laies down two poſitions, whereof one is, that there is no *Hot-bath* without *Sulphur*; the other, that an *Acid* is neceſſarily requiſite in all *Mineral* fermentations: Declaring withal, what he means by *Sulphur*, and how *Hot-baths* differ chiefly according to the difference of their *Sulphurs*; and which of them are ſafely, or not ſafely to be taken *inwardly*: Endeavouring alſo to ſhew, how from the principles ſpecified, put into fermentation, the waters paſſing through them muſt neceſſarily become *hot*; confirming this by an induction of Experiments, ſhewing, how *Sulphur* by Fermentation becomes to be comminuted,

nuted, volatilized, and made capable of Solution in *Water*, as happens in all Baths: All which he illuſtrates by a Parallel betwixt *Mineral* and *Vegetable* Fermentations; eſteeming, that Vegetation is nothing but a natural ſlow-paced Fermentation from each Plants peculiar principles of Acid and Sulphur.

In this part he examines and diſallows both *Tachenius* his Hypotheſis of *Acids* and *Alcaly's*, and the Cauſe aſſigned by divers Authors of the *Heat* in Natural Baths, *viz. Subterraneal fires*; and withal removes the grand Objection alledged againſt *Sulphurs* being the cauſe of Heat in Baths, *viz.* that if *Sulphur* can give actual heat, it muſt burn; aſſerting, that Sulphur may be one of the efficients of Heat in Baths, and yet its *flagration* not requiſite at all.

Diſcourſing of the *Acidum*, as the other cauſe of all Mineral Fermentations, he declares, that he means here by *acidum* either ſuch as is inbred in the ſame Mineral concretion, whilſt in *ſucco ſoluto*, in the beginning of its generation; or an extrinſick ſupervening one, which is powerful in the reduction of Minerals already ſolid and compleated. This done, he proceeds to prove, that there are Acid juyces in the bowels of the Earth, and that theſe are either embryonative to the ſame Mineral where the Sulphur is, or elſe peculiar to ſome other body by which the tranſient Waters become acuated.

Explaining, *How* the waters in *Hot-baths* become hot, he endeavours to ſhew, *firſt*, that ſome ſorts of *Acids* have ſo powerful an operation upon *Sulphurs*, as that being put into motion they are ſufficient cauſes of fermentation in Mineral Juyces; and *next*, that *heat* is the neceſſary and immediate reſult of ſuch fermentation: Where he takes notice, that the fermentation, made betwixt *Spirit* of *Nitre* and *Butter* of *Antimony*, is not from the *Salts* in the ſublimate mixing with the Acid in the diſſolvent, becauſe, *ſaith he*, the ſame, poured upon the ſame Salts while incorporated with *Mercury* in the form of Sublimate, cauſeth no ſuch fermentation; yea, he affirms to have ſeen Sublimate, wherein the aforeſaid Salts that are in Butter of Antimony are lodged, diſſolve in an *acid*, without the leaſt ſenſible ebullition, near as ſoon as Ice in warm water. To this he adds, that 'tis *water* that ſets the *inbred* principles of *acidum* and *ſulphur* into a greater inward commotion, and makes the fermentation the ſtronger, and conſequently the *heat* greater; witneſs that a little water, put to *Oil* of *Vitriol,* preſently ſets the fermental principles of acidum and ſulphur, connatural to that Oil, into a ſtrong ebullition, whence reſults ſo great a heat, as the glaſs, 'tis done in, can hardly be endur'd by the hand, eſpecially if the Oil be well rectified; which he confirms by the Obſervation of good Authors, aſſerting that in many places *Mines* are found ſo hot, that they can hardly be touch't: As the *Minera* of *Allom*, or *Vitriol,* being broken and expos'd to the Air, contract ſo ſtrong a heat, as ſometimes to cauſe an actual ignition, by which (he ſaith) not long ſince a *Barn* at *Yeeland* near *Halifax* was burnt.

Having thus deliver'd his *Hypotheſis* of the cauſes of *Hot Baths* from the fermentation of mineral Juyces, cauſed by acids and ſulphurs, he goes on to ſolve from thence various other ſubterraneal Effects, ſuch as are *Damps*, *Poyſonous Springs* and *Lakes*, as alſo thoſe of *Earth-quakes*, *Eruptions*, *Concrete Sulphurs*, *Spaw-waters*; concerning the laſt of which he ſaith, that where there is a current of water irrorating ſome Earths or mineral beds of Iron or Alom-ſtone, there are made Vitrioline or Aluminous Spaws. Hence he deſires his Reader to conſider, whether from the ſame ſuppoſition of cauſes may be ſolved the *diverſity of Winds*, the *viciſſitudes of Heat* and *Cold*, the appearances of *Meteors*, *Snow*, *Hail*, *&c.* He offers alſo, from the ſame principles to explain the two great phænomena of *Heat* and *Light*, found in concrete bodies; yet leaving it to further examination, whether in that great Fountain of Light, the Sun, its perpetual emanation of Light may not conſiſt in a peculiar fermentation of its own, ſet a work by the Creator, and kept a foot by a continual circulation of Ethereal matter: Endeavouring in the mean time to ſhew, 1. How *Heat* is produced from fermentation in all ſuch bodies where 'tis found. 2. How from the ſame Principles of Acid and Sulphur *Light* is made. Where by the by, he labours to prove, that the Fermentation in Mineral Juices, whether natural or artificial, proceeds not from the *Contrariety* of *Salts*, becauſe there is no ſuch ebullition among Salts, but what is from the conflict of Acids and Sulphurs, whereas it never yet could be made appear (*ſaith he*) that theſe minerals contain'd any ſort of *Alcalies*, either fixt or volatile, though it be certain to him from irrefragable experiments, that *Sulphurs* and *Acids* are ſeparable from them all. And as he ſhews this in *Minerals*, ſo he undertakes to do it in the Fermentation of *Animals* in all the degrees of digeſtion made in their bodies; deriving alſo thoſe ſpurious fermentations of the Blood, that cauſe Feavours of all ſorts, from *Acids* not congenial, but wholly diſagreeable, and heightening the natural gentle fermentation to an inflammation of the blood and other Juices: aſcribing likewiſe all the *poyſonous properties* of Venemous Animals to the invigorated ferments of their juices, raiſed to that height, as to become poiſonous fire, which by a bite or ſting getting admiſſion into the blood of a human body, will, according to their ſeveral degrees, in their paſſage bear down and mortifie the ſpirits thereof. Whence he endeavours to give an account of the effects of thoſe *Fiery Serpents*, we read of in Holy Writ, and of that matter called *Gecco*, vomited by ſome ſort of venemous creatures, upon their being whipt and hung up (which exaſperates their ferments;) which matter is uſed by ſome *Indians* as a ſpeedy death to their Malefactors, by pricking the skin under a nayl of the hand, and applying a little quantity thereof to it, which immediately getting into the blood, preſently ſuſpends the natural fermentation thereof, and mortifying the ſpirits, kills preſently.

Having ſhew'd this in *Minerals* and *Animals*, he attempts alſo to verifie it in *Vegetables*, *viz.* that *Vegetation* is nothing elſe but a gentle colliſion of the Vegetable Acid and Sulphur in every ſeed, after the looſening of the body in the Earth; which ceaſeth not, till the body, ſhap'd according to the form of thoſe minute types wrapt up in the ſeedlings, and often viſible by Microſcopes, is in all its pourtrayings brought upon the viſible ſtage of the world. And from ſuch a fermentation he would alſo deduce the *Colors*, *Sapors*, *Odors* of Vegetables, and their *Medicinal* qualifications, and their *Propagation by ſeeds*; as alſo the reduction of Corn, Grapes, Fruits, &c. into Bread and Drink; obſerving, that if the acidum of Paſte, Muſt, Worr, or the like fermentable liquors, be by the addition of any other thing precipitated, alter'd, or mortified, then will thoſe liquors never ferment; ſince that Quick-lime, Coral, Crabs-eyes, or any ſort of *fixt Lixivial Salts*, being added thereto, before it begin, will prevent, or, if while fermenting, will ſtop the fermentation.

He proceeds to explain, that the moſt violent of *Fires* is no other than this *Fermentation* in the moſt rapid manner, the ſaid Principles furiouſly driving up each other; alledging, for the evidencing hereof, the Experiment of taking of Spirit of Venice *Turpentine* four ounces, and of *Aqua-fortis* ſix ounces, both recently drawn, which, being mixt together in a Glaſs-viol, will preſently fall into a furious fermentation, ariſing to that height, as actually, among the thick fumes, to burn and blaze out of and above the outſide of the Glaſs in a viſible flame. And thus he would have all *actual Flagrations*, whether from the violent aſſaults of fiery Acido-ſulphureous Liquors (as in the newly recited Experiment) or from *Acids* and *Sulphurs*, ſet in to inteſtine conflicts in combuſtible concretes, (as in all uſual *fire*,) to be no other than his deſcribed Fermentation in a moſt violent hurry, the principles acting furiouſly upon each other; whilſt other *ſlower fires* are maintained by ſlighter and more *gentle touches* of the ſame principles.

And as to thoſe Fermentations, that are ſaid to be made betwixt *Acids* and all kinds of *Alcaly's*, whether lixivial or alcaliſate, fixt or volatile; the heat alſo cauſed from the attrition or colliſion of ſolid and hard bodies; our Author is of opinion, that thoſe fermentations are referrable to his principles, and that upon a double account; either, that Acids, when mixed with theſe Alcaly's, do meet with the *Sulphur* cloſe bound up with the *Acid* and Urinous ſpirit or Salt in the *compages* of the Alcali, and ſo cauſe an ebullition; or that they meet with the volatile urinous Salt cloſe riveted with the Sulphur and acid, and ſo cauſe an efferveſcence. Where yet he ſhews the difference, that is to be noted in the Fermentations made between Acids and Sulphurs as they happen in Petrifick concretions and fixt Lixivial Alcaly's, from thoſe that happen in the general courſe of Nature, among Animals, Vegetables and Minerals. To which he adds an account of the fermentation in *Quick lime* upon the effuſion of water, and how that the *acidum* in that ſubſtance ows its original to no other than that of the Fire, contracted in the calcination of the ſtone, and was not præexiſtent *before* calcination. To which power of the *acidum* in Quick-lime, communicated thereto by Fire in the calcination, our Author imputes it, that the *Water* of *Lime* will perform what other more uſual Acids cannot: *E. g.* that *Lime-water* mixed with any *volatile Urinous Salts*, and diſtilled there-from, fixes the Salt, and even turns it into an inſipid powder, or indiſſolvable calx, &c. After which, he ſpends a Chapter in explaining, how the Heat and Ignition, which is cauſed from the Colliſions and Attritions of *hard* bodies, may be eaſily ſolved from the Principles delivered by him.

And having run through the Cauſes of *Heat* and *Fire*, as the reſult from all ſorts of Fermentations, and ſhew'd, *Heat* to be Fire in a remiſs, and *Fire* Heat in an intenſe, degree, as alſo, that theſe Fermentations proceed from a conflict of *Acidum* and *Sulphur*, excepting thoſe made from an inteſtine combat of an *Acid* and a fixt *Alcali*, or an *Acidum* and *Urinous ſpirits*; he comes to explain, How from his doctrine of Fermentation may be ſolved that grand phænomenon of *Light*; and *firſt*, the Light from *Culinary-fire* or ordinary combuſtible concretes, put into that rapid fermentation we call *Fire*: *Next*, the Light of all *Sulphurous matters*; whether in the dry form of *Mineral ſulphurs*, *reſinous Gums*, *Turpentine*, *Axungia's*, *&c.* or in Liquids, as *Bitumens*, *Oyls*. *Vinous ſpirits*, *&c*: Then, the Light of *rotten Wood*, *long-dried Fiſh*, *Gloworms*, *Cats eyes*; as alſo that from *Attrition of Wood*, and of *Steel* and *Flint*; from the *friction* or *combing of Animals*; and likewiſe the Light of *ſubterraneal Lamps*: Upon which laſt Head he ſomewhat enlargeth by diſcourſing of the poſſibility in nature of ſuch a-kind of Fire, that may be maintained and perpetuated *without* Air; affirming, that himſelf hath ſeen a Flame or Fire in the cavity of a Glaſs, which as ſoon as the ſtopple was taken out, was (contrary to all other fires) immediately extinguiſh'd. To which he ſubjoyns an explication of the Light of ſome *precious Stones*, the *Bononian ſtone*, and likewiſe of *Meteors*; all which give light in the Air not illuminated by any light from the Sun, but by an excitation of their intrinſick Ferments, ſetting above-board their inſide *tepor*.

He concludes the whole, *partly* by confirming his Principles from collateral authority; partly by ſhewing, How that all manner of *Coagulations*, *Congelations*, *Condenſations*, *Salifications*, *Petrifications*, and all ſorts of Concretions of bodies (or of Juyces into bodies,) are primarily aſcribable to *Acids*; and that by theſe Concretions the connate *Acidum* ſo combines with the *Sulphurous* parts it cloſeth with, as that both paſs into a *tertium quid*, or neutral reſult, partaking of both, and yet diſtinguiſhable by neither; inſomuch that the *Acidum* by ſuch ſort of coagulations and concretions looſes its ſting, and becomes altogether unperceivable: Whence he draws the reaſon, why, though *Acids* be the very foundation of all coagulations and concretions of bodies, yet are themſelves to our taſte in many things the leaſt diſcoverable: Which particular he endeavours to make out by *artificial* mixtures, reſembling the *natural*, ſeeing we cannot eaſily get to the inſides of bodies in their natural productions.

As to his diſcourſe of the *Sulphur-Bath* at *Knarſborough* in *Yorkſhire*, concerning its *Cauſes* and *Vertues*, we ſhall refer the Reader to the Tract it ſelf.

Errata in *Numb.* 116.

In the Contents l.5.r. *bleak* for *black*; noting the ſame p.357.l.4, and 23. p.357.l.*numb.*179. for 176, p.360. l.6.r.*triture* for *mixture*, p.362.l.15. r.*take the better*. ibid.l.ult.r.*work*, p.363.l.21.r.*walking ſpeed*, ibid.l.29. r.*from the ſteepeſt*.

N.B. in *Numb.*112. p.273.l.3 and 4.read, *is by the Cycloid*: which, upon a freſh peruſal of that *Extract*, we took notice of, though too late.

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